



**Fifth International World Wide Web Conference**

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## **Ubiquitous Advertising on the WWW: Merging Advertisement on the Browser**

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### **Keywords**

World Wide Web, advertisement, advertising agent, 1:1 future, Web server, Web browser, Web page, Web site

### **Abstract**

We propose a new advertising framework on the WWW. Some popular WWW sites now provide advertising space in their Web pages. However the actual effectiveness of the advertising is questionable. In our advertising framework, an advertising agent is placed between advertisers and users. The agent's business is to deliver advertisements to users who wish to see advertisements on their Web browser. Users will see a variety of advertisements at the sites they visit, even if the sites have no advertisements on the Web servers. This will make the advertising business on the WWW really ubiquitous.

### **1. Introduction**

To sell goods or services, advertisement is the first step to making them available to the public. TV and newspapers are representative media that have advertising spaces for commercial purposes. The operational cost of commercial TV stations and newspaper publishing companies is covered by the advertising revenue. This makes it possible for people to receive TV programs at no charge and to subscribe to newspapers very cheaply.

The World Wide Web is a new way of presenting information to the public via the Internet. Advertising on the World Wide Web has increased rapidly over the last few years. However, the mode of advertising has so far been similar to that used in TV and newspapers in essence.

Service providers on the WWW such as Yahoo![1], a popular Internet directory service, prepare advertising space in their Web pages and sell this space to advertisers by the hour. The anchors (links

to advertiser's Web servers) are placed on the sold small spaces, and are displayed to users as small clickable images. When they click one of the anchors, they are then connected to that advertiser's own commercial Web server.

WWW advertising in its current state is better than nothing, but the cost benefit is questionable for the following reasons. Firstly, the host Web server must be very popular on the Internet. If the host is not sufficiently popular, the number of the people seeing advertisements placed on the server will be small. Secondly, the advertising host server does not usually permit a competitor company's advertisements to be displayed. For instance, Microsoft is most unlikely to advertise IBM products in their Web server.

Therefore, the advertising host server should be very popular on the Internet and, at the same time, unbiased, to earn enough money from the advertising business. Network directory services and virtual shopping/business malls are possible candidates. However, the services offered by such servers are gateway services in essence. Users are normally busy searching for information resources through the gateway services, and there is no reason for them to waste their time reading advertisements. This creates an "advertising vacuum."

We propose a new advertising framework on the World Wide Web. It will fill this "advertising vacuum." An advertising agent is placed between the advertisers and the users. Advertisements fetched from advertisers' Web servers are merged with Web pages from ordinary Web servers by the agent, and the merged pages are displayed on the users' Web browser. Thus, the users see advertisements on any server around on the Internet. Moreover the agent has chances to deliver appropriate advertisements which suit each user's taste. This is a move away from the current state of advertising on the WWW and will make the advertising business on the WWW really ubiquitous.

## 2. A New Framework for Advertising on the WWW

Figure 1 illustrates the ordinary usage of the WWW. This can be compared with Figure 2, which is an overview of our new advertising framework. In Figure 2, the advertising agent company's Web server is new. It has an important role: Delivering advertisements to users whenever they access ordinary Web servers.

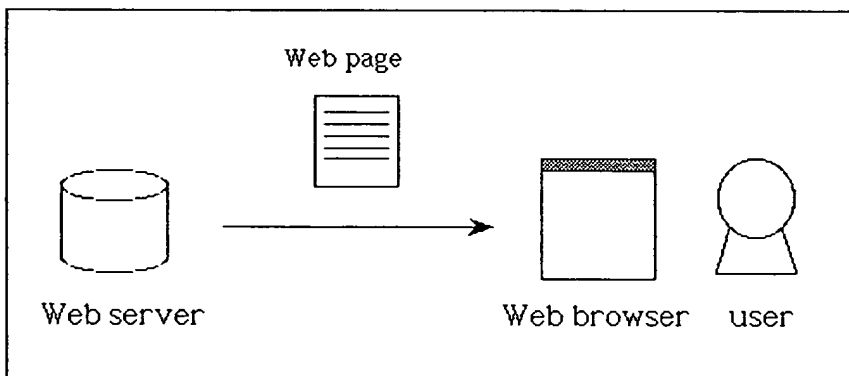


Figure 1: Ordinary WWW usage

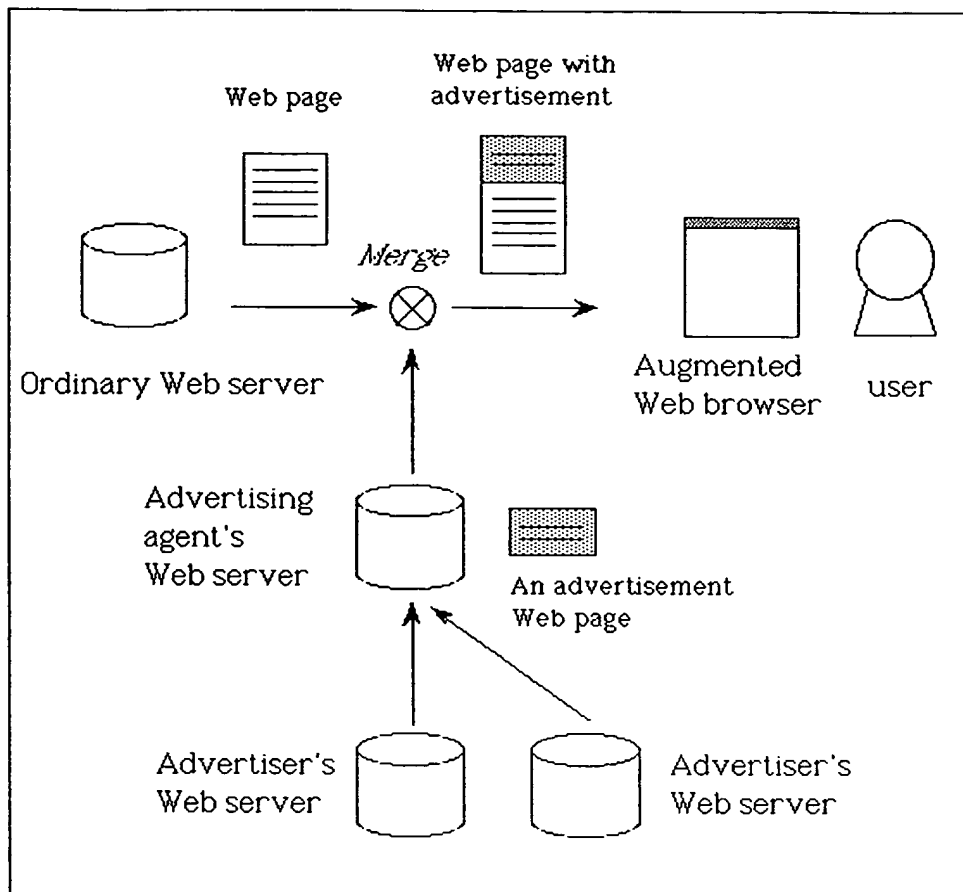


Figure 2: A new advertising framework on the WWW

## 2.1 Making Contracts with Advertising Agents

First of all, the advertising agent company makes a contract with advertiser companies. Remark that ordinary users can become advertisers or advertising agents if they are ready to pay for it, but we use the word, company, to make the explanation brief. The agent company is responsible for delivering advertisements to users. The advertisements are stored on the agent's Web server. Otherwise they might be kept on the advertiser's Web servers with just the links to them stored in the agent's Web server.

Next, the advertising agent company also negotiates with users, who agree to see advertisements while browsing. This is similar to subscription procedure for technical magazines, which are full of technical articles and advertisements which target is the subscribers of the magazines. The agent company is responsible for delivering the appropriate advertisements to the users. Thus, the contract should at least allow the users to specify what categories of advertisements they wish to see. For example, a user can declare that he or she is interesting in new books, new personal computers, and used cars. It is wonderful if we could determine a user's current and long term interests with no declaration, but it is not quite ripe for the real use. Moreover the contract may request user's private information, such as sex, age, and home address in real life. If the agent has user's private information, it can pick up more focused advertisement for each user.

At last, the agent company should offer some clear benefit to attract the users to the business, because people do not positively want to see advertisement. The agent company could pay for all or part of

the customers' connection charges.

## 2.2 Delivering Advertisements to Customers

Users who have made a contract with an advertising agent are given a Web browser by the agent. The Web browser software knows how to receive advertisements from the agent. Technically, the browser merges Web pages fetched from more than one Web server and displays a composite Web page on the window. In Section 3, we will describe the browser mechanism in some detail. You will find the modification to the current browsers is very small and reasonable.

When a user clicks an anchor on a page displayed on the browser, the browser contacts the Web server and returns a Web page designated by the anchor. Simultaneously, the browser contacts the advertising agent's Web server. The agent's Web server returns a Web page of one of its advertisements. Then the browser merges those returned Web pages, and displays a composite page on the screen.

Note that the agent is aware of the identity of the user and which page the user is about to read on the browser, so the advertising agent can tailor advertisements for *individuals and their current interests*. Thus it prevents the user from having to see advertisements that are unrelated to their current interests. Unexpected advertisements would irritate users in much the same way as a magazine article that is split up with intervening advertisements.

## 2.3 Assessing Advertising Agents

Advertisements returned from the advertising agent's Web server can have links to other pages which might, for example, be more detailed advertisements or online order forms for the advertised goods or services. When users follow these links, the advertising agent can detect these actions: Who, when, to what page. The agent records the actions, and the accumulated record can be used by the agent to show the effectiveness of their services to the advertisers.

## 2.4 Competition between Advertising Agents

An advertising agent must have a good strategy in order to beat the competition. The role of an advertising agent company is to offer mutual benefits to advertisers and users. If the users feel there are no benefits from using the services of one advertising agent, they will go to another. Similarly, if advertisers judge from the records that their advertisements have not been delivered to appropriate users, they will also go to another advertising agent.

There are three possible strategies for an advertising agent. Firstly, there is no need to deliver advertisements continuously. It might be more effective and impressive to deliver advertisements at some intervals. Secondly, other useful information, such as the latest news and latest weather information, might be delivered instead of advertisements at the user's convenience. Thirdly, more "intelligent" advertising is possible. Suppose that a user obtains an online order form for some goods. The advertising agent can detect this event. It then examines the order form to see what goods the user wants and the price offered. Then the advertising agent can create a special offer and deliver it to the user, which tells the user that another company (one of the agent's advertisers) would sell the same goods at a lower price than the company that has the online order form.

## 2.5 Privacy Issues

In the Internet, privacy is one of the first issues. Advertising agents keep their customer's private information, such as age and home address. Therefore the contract between advertising agents and the customers should include a privacy clause which prohibits the agents from forwarding their private information to advertisers without permission.

## 3. A Prototype of Ubiquitous Advertising on the WWW

In this section we describe a simple prototype of our new advertising framework.

### 3.1 Invoking Filter Programs When Opening URLs

We use a slightly augmented Web browser which can merge Web pages from different Web servers. As shown in Figure 3, a special "Filter Program" menu item has been added to the ordinary browser. Selecting this item, a window is opened and the names of filter programs can be specified. Filters are programs "which have one input, one output, and perform a useful transformation on data as it passes through[2]." Those filters can be piped in order as illustrated in Figure 4.

The filters are invoked when an anchor is clicked in the browser's window. At invocation, environment information is passed to each filter program as invocation parameters. The environment information includes at least the identity of the user and information about the selected anchor. The contents of a Web page designated by the anchor are input into the pipe of filters, and the output from the pipe is displayed on the browser's window as an HTML document.

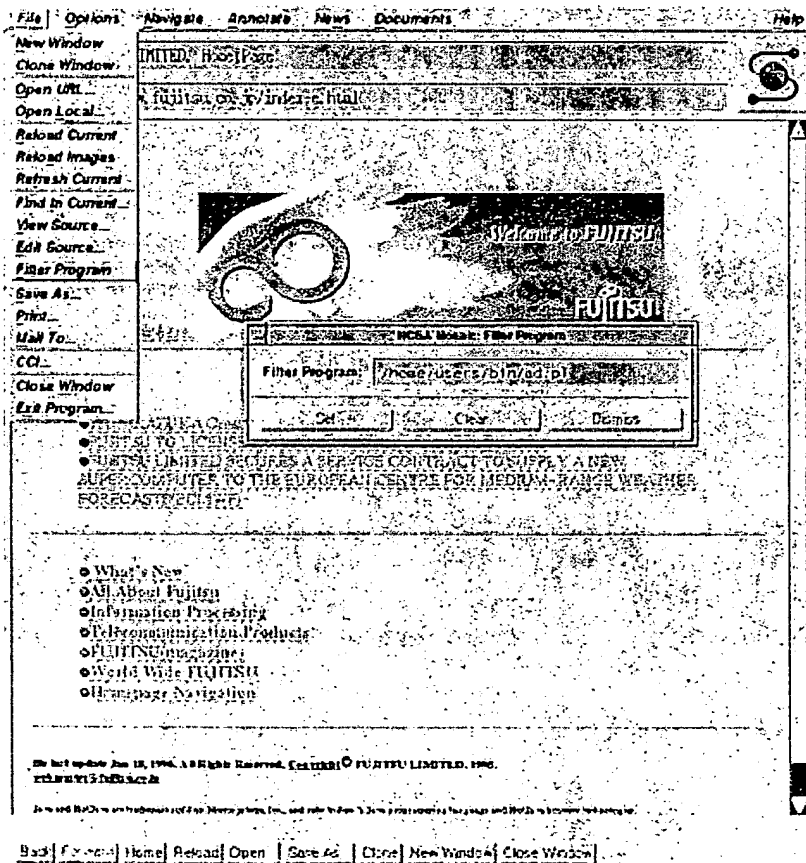


Figure 3: "Filter Program" menu item is added

Figure 3: Filter Program menu item is added

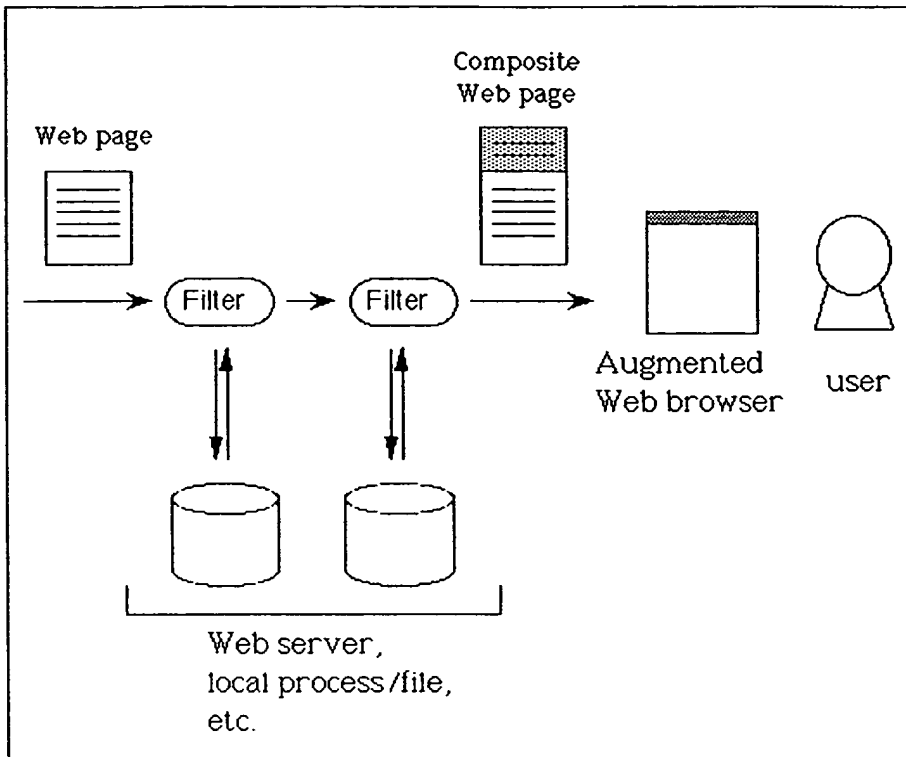
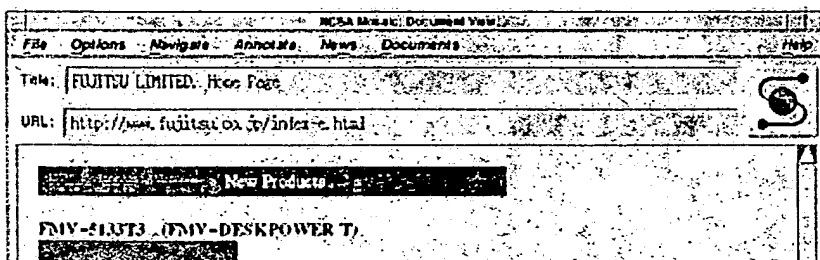


Figure 4: A pipeline of filter programs

### 3.2 A Filter Program Which Weaves Advertisements

A special filter program is shipped from the advertising agent to a user, once the user has made contract with the agent, and the user puts the filter program in his/her browser. The filter keeps in memory the contact path (URL) to the agent's Web server. When it is invoked, it forwards the invocation parameters passed from the browser to the agent's Web server, and waits for a reply. Then, the agent's Web server returns one of its advertisements or other useful information. The filter merges the reply from the agent's Web server before the input from the pipe, i.e., Web pages from other Web servers.

Figure 5 is an example of a Web page with an advertisement; a new product advertisement and a Home page. The strategy on how to weave advertisements in this example is quite easy; advertisement is inserted before. Please note that the advertisement in Figure 5 has an anchor (labeled as "For More Information") in it. When a user clicks this anchor, a more detailed advertisement would be displayed. At the same time, the click action is recorded at the advertising agent. The advertising agent can show a summary of the record whenever the advertisers request it.



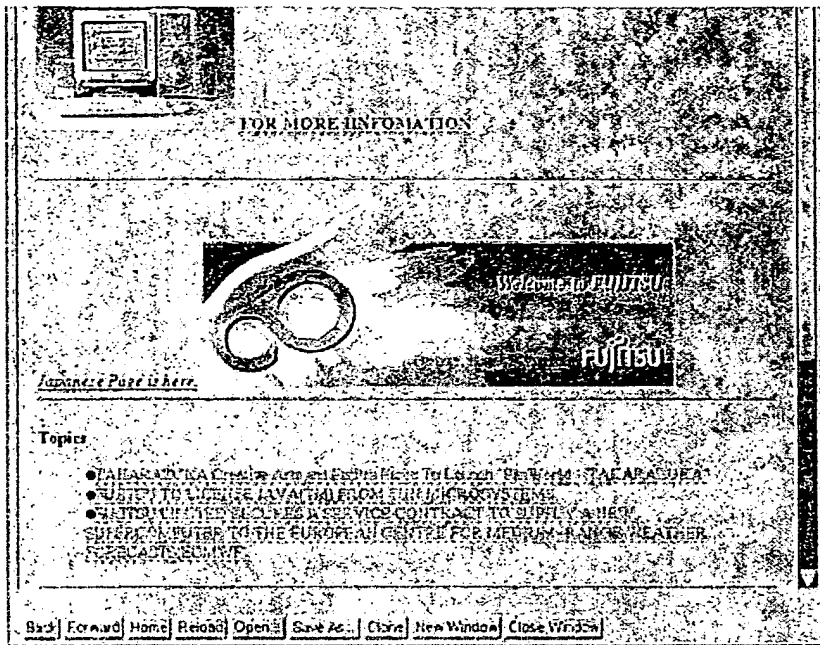


Figure 5: A Web page with an inserted advertisement

### 3.3 Comments on the Current Implementation

We have already implemented a working prototype of this ubiquitous advertising on the WWW. Figure 3 and 5 are snapshots taken from the computer screen.

We have made a very small improvement to NCSA Mosaic. We have added a new menu item, "Filter Program," just after "Edit Source.." menu item. "Edit Source.." in NCSA Mosaic invokes an editor whose initial content is the HTML document of the currently displayed Web page. When exiting the editor, the edited HTML document is displayed as a new Web page. Filter programs set by "Filter Program" menu item do the almost same work without user intervention. For example, if we put a "capitalize" filter (though it should remain intact between `<A>` and `</A>`), the characters displayed on the browser are all capitalized. We believe that this additional feature is simple and powerful, and therefore it is reasonable to add this feature to ordinary browsers as a standard facility. Instead, a specially tailored proxy server could realize the same functionality, but authentication of users should be incorporated in the proxy server at the same time to distinguish individuals.

A sample filter program which inserts advertisements before the original Web contents has been coded in Perl, which includes access to remote Web servers. This advertisement-insertion needs extra time and might make users irritated, but we believe this performance degradation will soon become smaller.

A sample Web server for advertising agents has been implemented as a set of Perl programs which are invoked through CGI. The programs include a program for advertisement delivery that searches an appropriate advertisement and delivers it to the browser, when the advertisement-insertion filter program set in the browser invokes the program via CGI. The call address to the delivery program will be coded in the filter program at the shipping time. The programs also include two programs for contracts, one for agent-to-user, the other for agent-to-advertiser. This means that users and advertisers can make a contract with an advertising agent on the Internet just with their Web browsers.

In this paper, we have proposed and prototyped the ubiquitous advertising on the WWW. However further research effort is still necessary, e.g., a test for advertiser/consumer acceptance, before putting this idea in the market.

One more comment on privacy issues. You can take off the advertisement-insertion filter program temporarily from your browser anytime you want, when you want to escape from the "supervision" of your advertising agent. This guarantees your freedom of exploration in the Internet, though you might miss some useful and important advertisements for you.

#### 4. Conclusion

We have proposed a new advertising framework, in which an advertising agent plays a central role. It delivers advertisements to users under contract and the advertisements are woven into ordinary Web pages on the browser. This differs from the current advertising technology in WWW; advertisements are woven in the servers which users contact. The PostCast Network is a typical example, which delivers personalized news, weather and other information, possibly including advertisements, through a special browser[3].

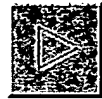
Our proposed framework can be seen as one feasible step toward 1:1 advertising on the WWW[4]. First, the advertisement is merged into an ordinary Web page on the Web browser, instead of on the Web servers. Hence, users could encounter a variety of advertisements on any server in the world. Secondly, the advertisement delivered is chosen, according to the user and the Web page he or she is about to read. Therefore, it focuses advertisements on the interests of the user. Thirdly, the actions of users in relation to a particular advertisement (i.e., reading its details or buying the goods or services) are recorded by the advertising agent. This record can be used to prove the effectiveness of the advertising agent to the advertisers.

#### References

- [1] Yahoo!: Internet Directory, <http://www.yahoo.com/>.
- [2] B. W. Kernighan, and P. J. Plauger: Software Tools, Addison-Wesley (1976).
- [3] PointCast: Internet News Network, <http://www.pointcast.com/>.
- [4] D. Peppers and M. Rogers, The 1:1 Future : Building Relationships One Customer at a Time, Doubleday, New York, 1st edition (1993). ISBN 0-385-42528-7.







## Slide List

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# Ubiquitous Advertising on the WWW: Merging Advertisement on the Browser

by Youji Kohda and Susumu Endo



## Profitable Advertising on the WWW

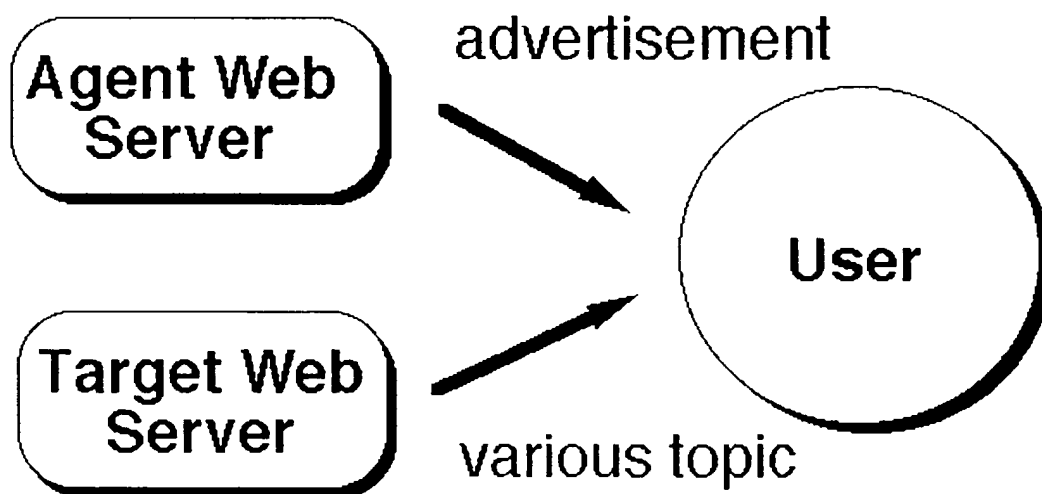
- Small "clickable" images have limited effectiveness:



- Advertisement should reflect user's profile
- Advertisement should reflect currently viewed topic

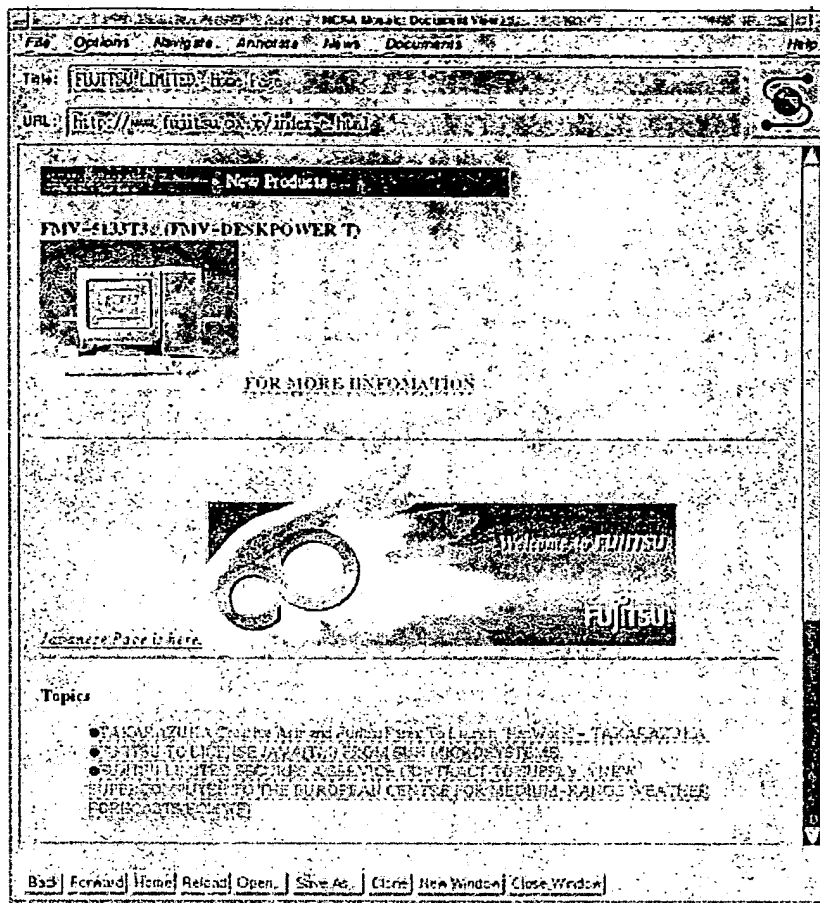
## Advertising Agents

- Clear distinction between ordinary Web sites and advertising Web sites
  - Agent Web server
  - Target Web server



## Merging Advertisement on the Browser

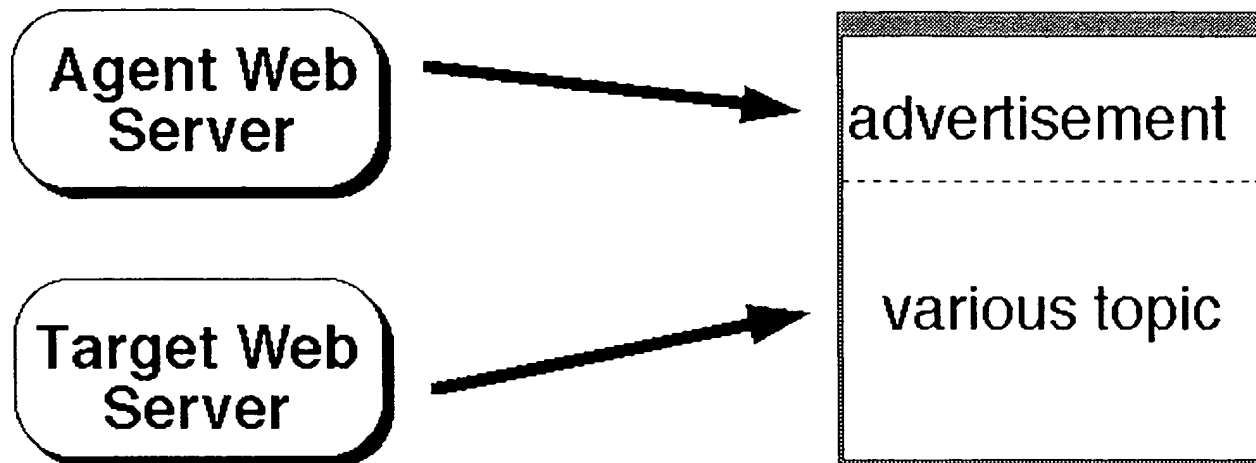
- Augmented Web browser merges advertisements and target Web pages "on the fly"



## New Advertising Framework

- Agent Web server
- Augmented Web browser

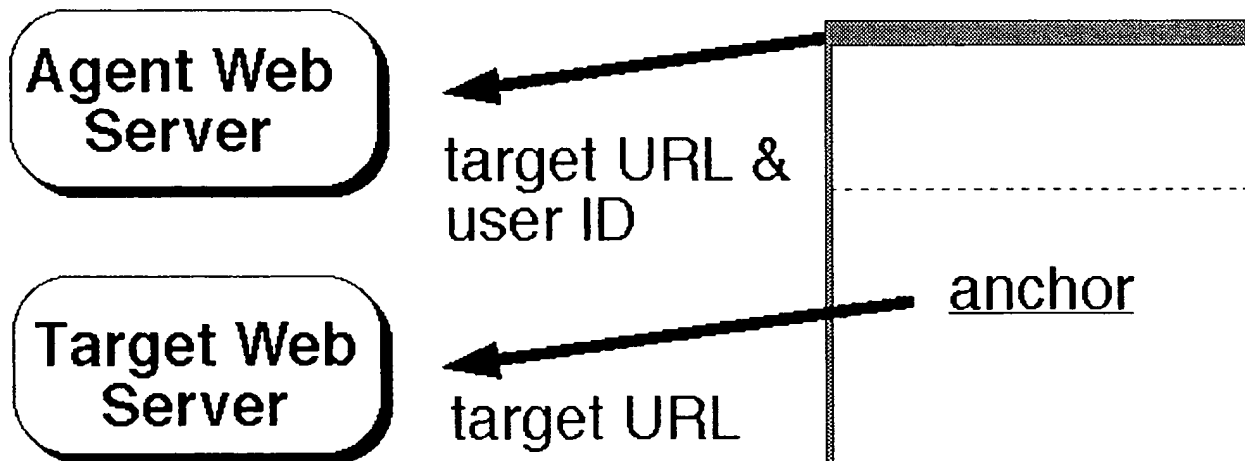
## Augmented Web Brows



## Augmented Web browser

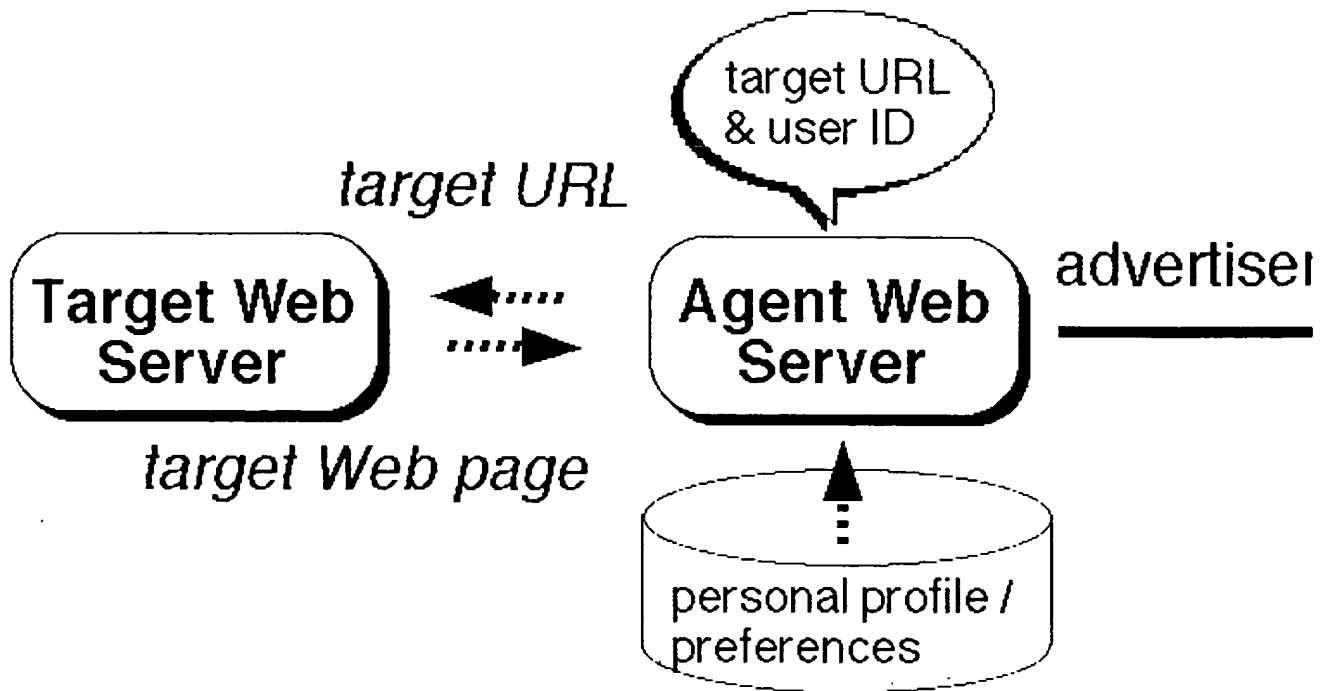
- Know the access path to agent Web server
- Make simultaneous access to target Web server and agent Web server
- Inform agent Web server that "who" (user ID) accesses "where" and "what" (target URL)

## Augmented Web Brows



## Agent Web server

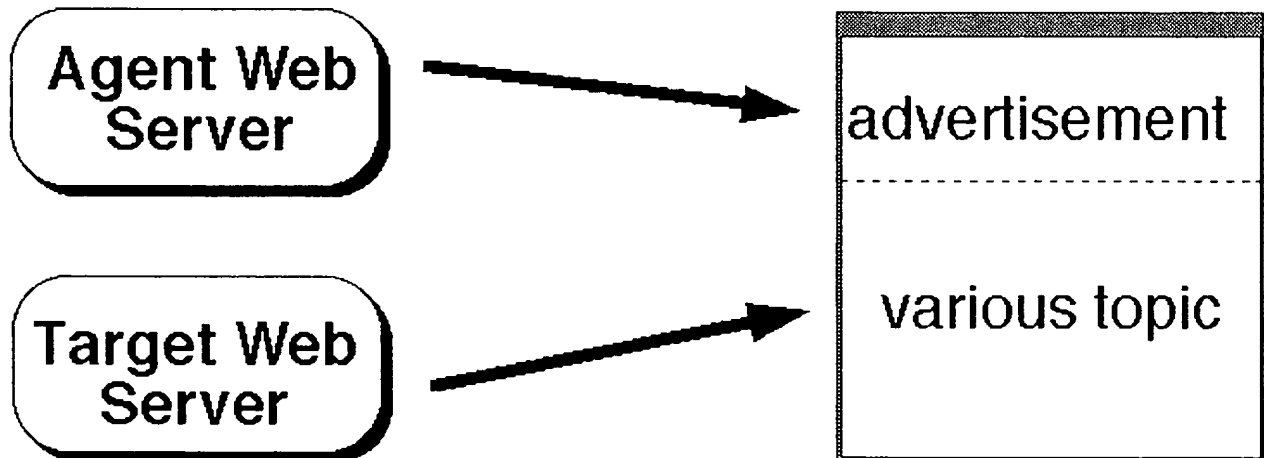
- Know user ID and target URL
- Return advertisement based on user ID and target URL
  - Advertisements can reflect user's profile
  - Advertisements can reflect currently viewed topic



## Augmented Web browser

- Add advertisements to Web pages

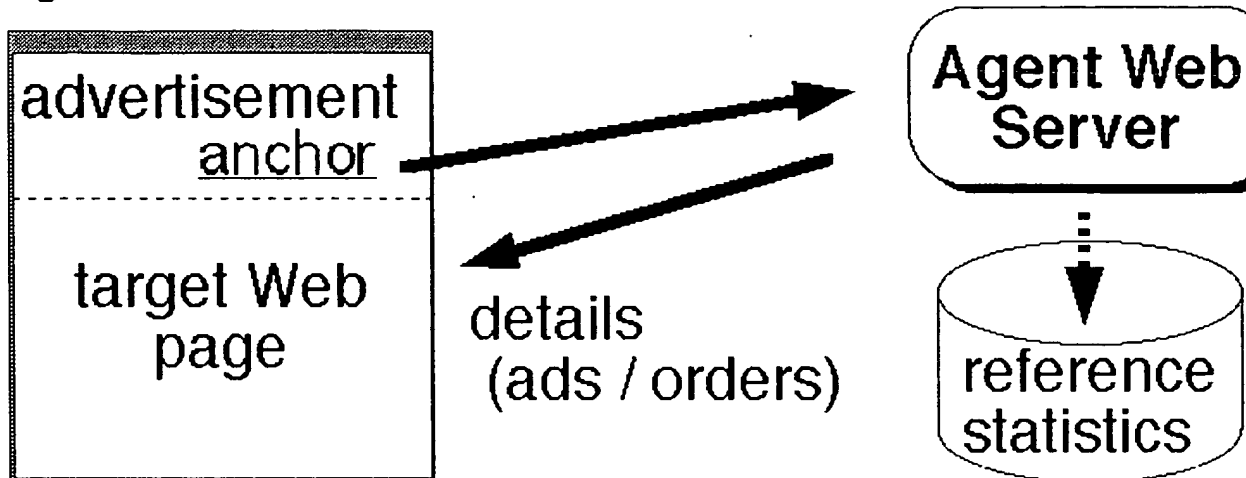
## Augmented Web Brows



## Agent Web server

- Details (ads/orders) could be fetched through anchors in advertisements
- These actions taken by users are recorded and summarized as reference statistics

## Augmented Web Browser

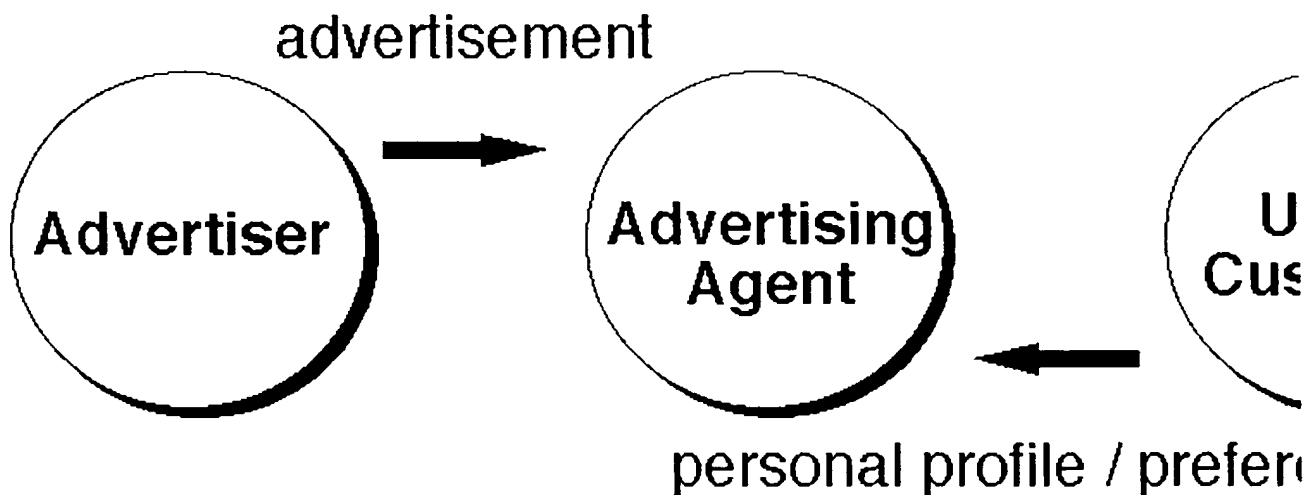


## New Advertising Framework

1. Registration
2. Advertising
3. Financial structure
4. Competition
5. Advertising strategy examples

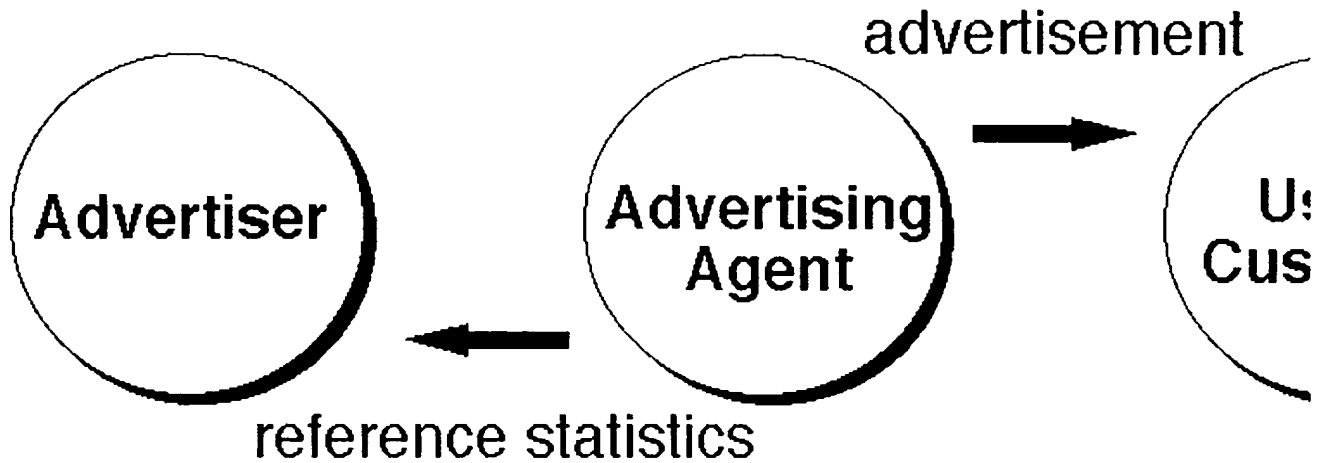
## Registration

- Users register their personal profile / preferences
  - e.g., age, postal code / interests
- Advertisers register their advertisements with:
  - e.g., subject category index, target customers



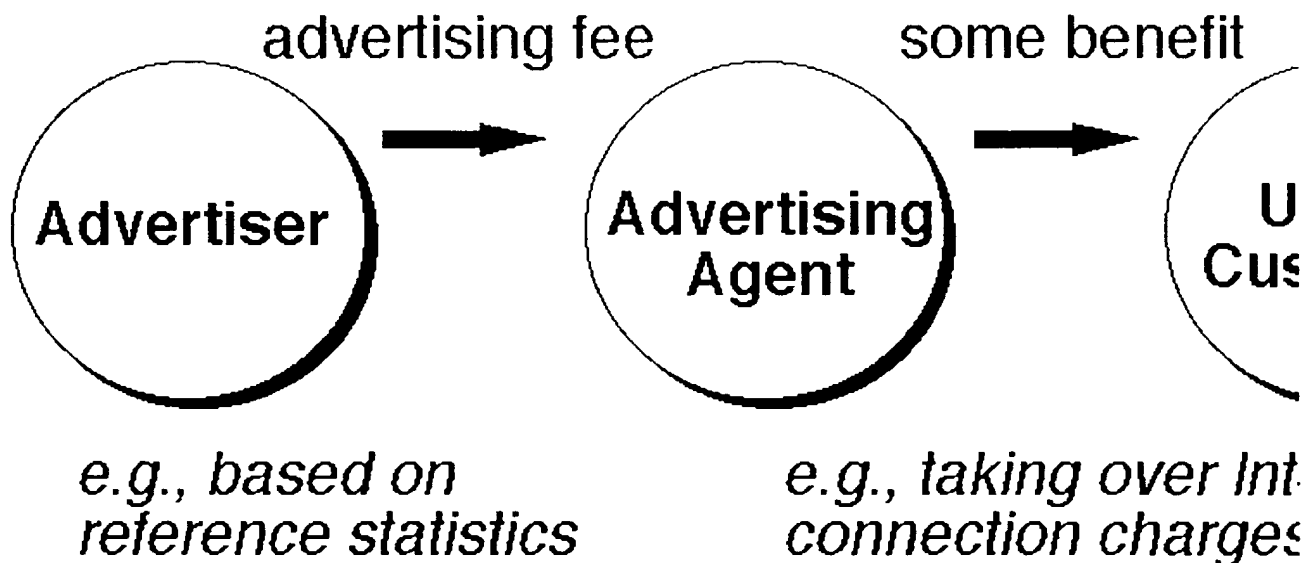
## Advertising

- Advertising agent sends advertisements to users on demand
- Advertising agent reports advertisement-reference statistics to advertisers



## Financial structure

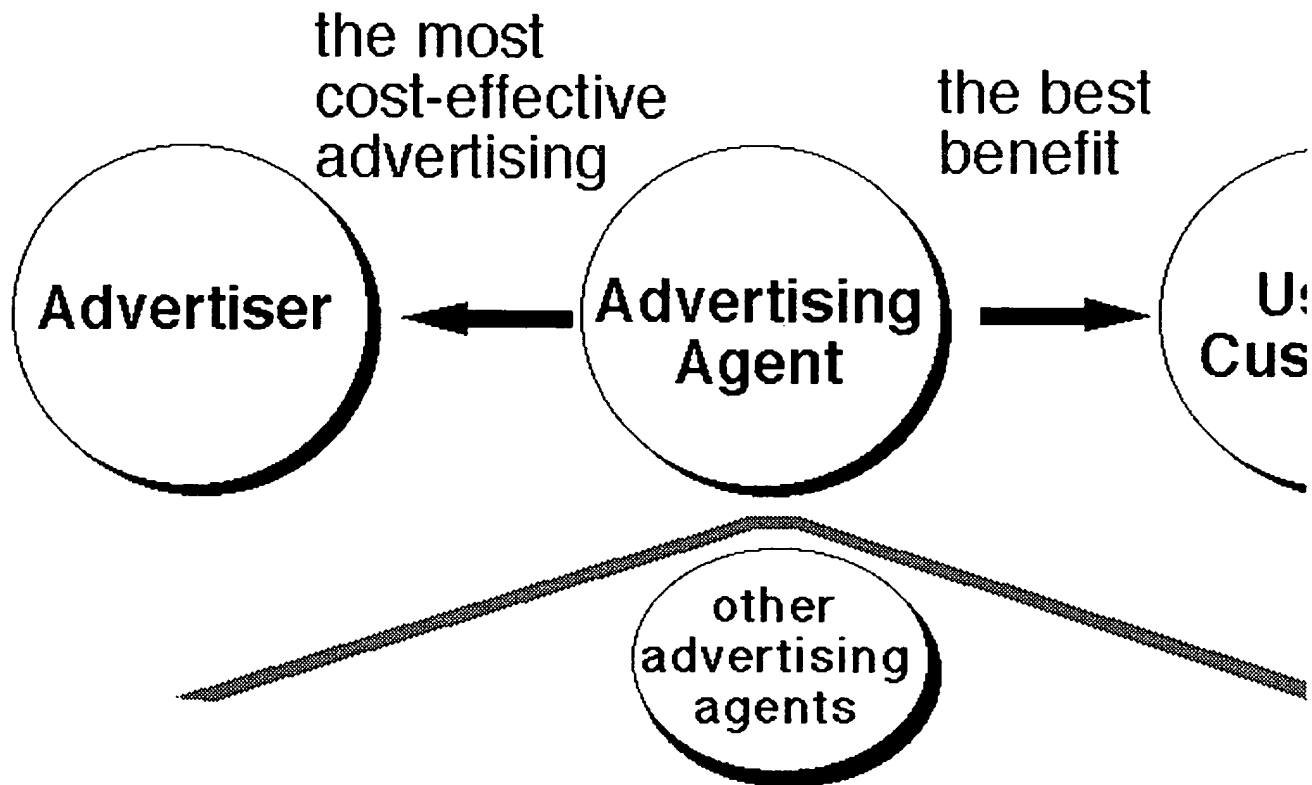
- Advertising agent offers some benefit to attract users
- Advertising agent obtains advertising fee from advertisers



## Competition

- Should offer the best benefit to users
- Should offer the most cost-effective advertising to advertisers

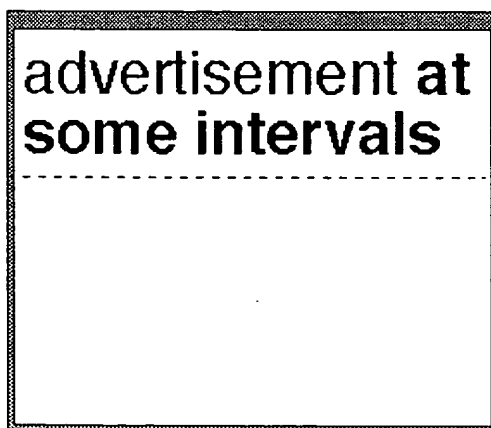




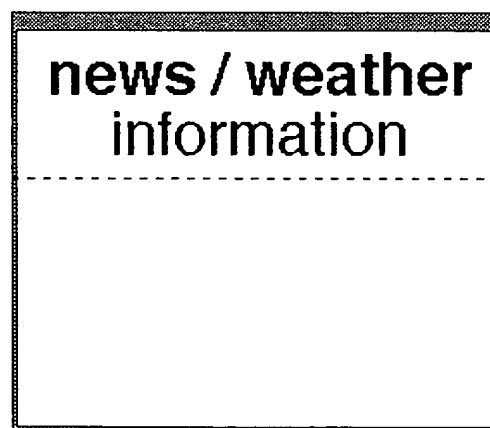
## Advertising strategy examples

1. Send advertisements fit to the currently viewed topic at some intervals
2. Insert the latest news/weather information instead of advertisements
3. Make counteroffers to "online shopping forms"

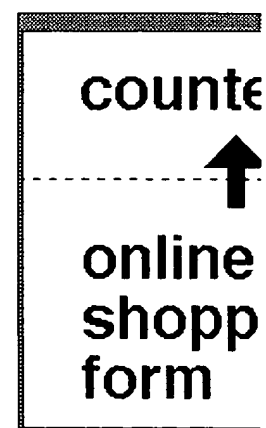
example 1



example 2



example 3

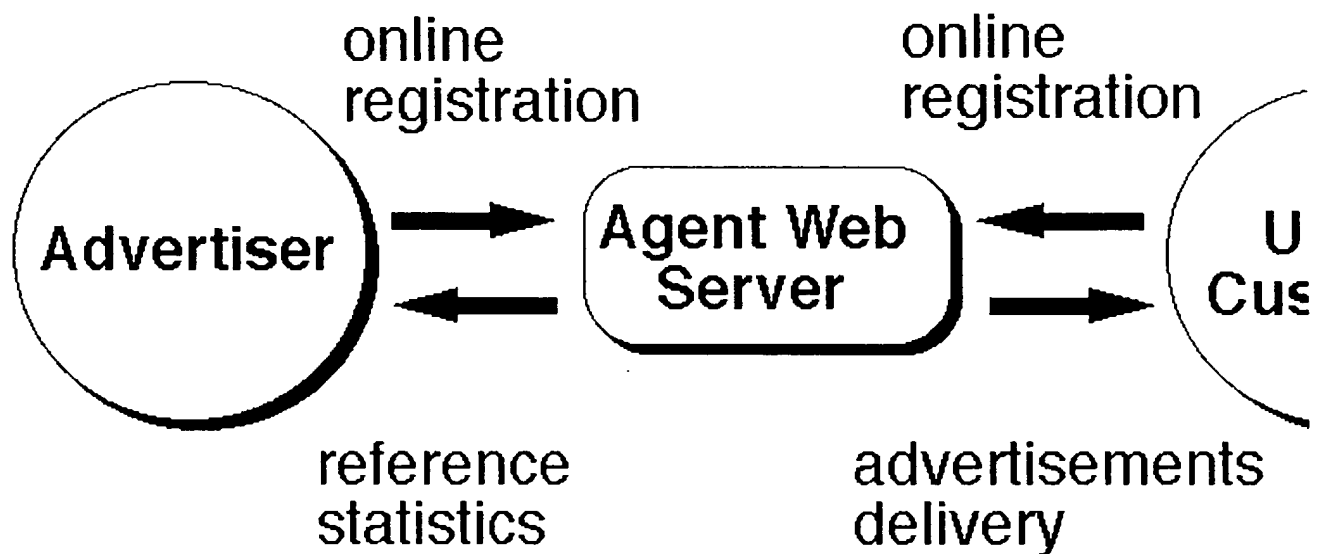


## Prototype Implementation

1. Agent Web server
2. Augmented Web browser
3. Plug-in UNIX-type filters
4. Advertisement-supply filter

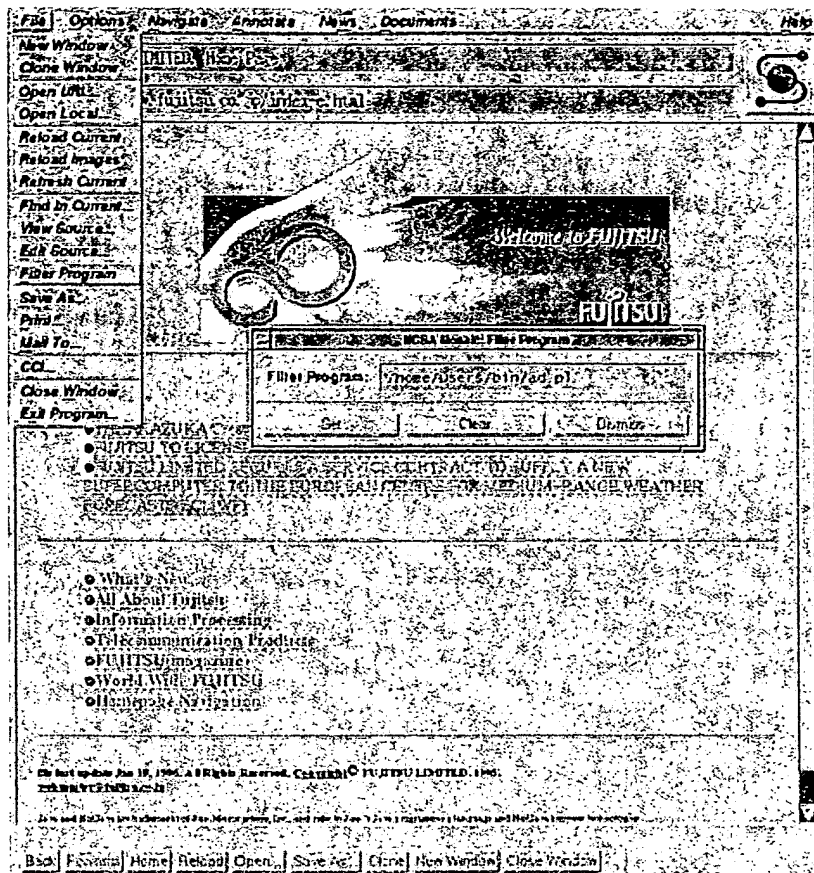
## Agent Web server

- Collection of CGI programs written in Perl
  - Registration interface between an agent and advertisers
  - Registration interface between an agent and users
  - Advertisements delivery interface to users
  - Statistics report interface to advertisers



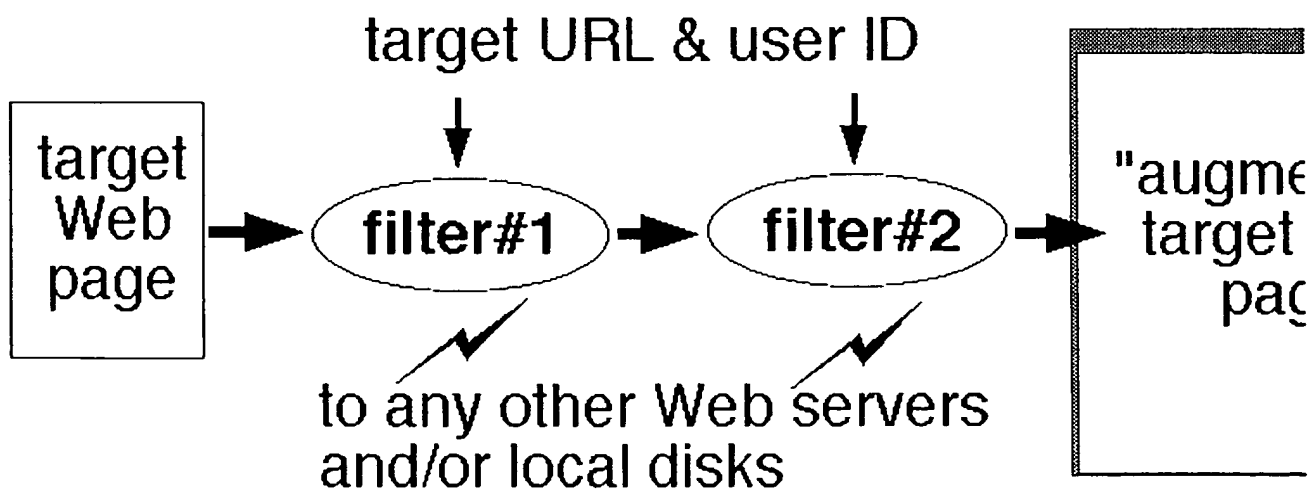
## Augmented Web browser

- Invoke UNIX-type filters when anchors are clicked



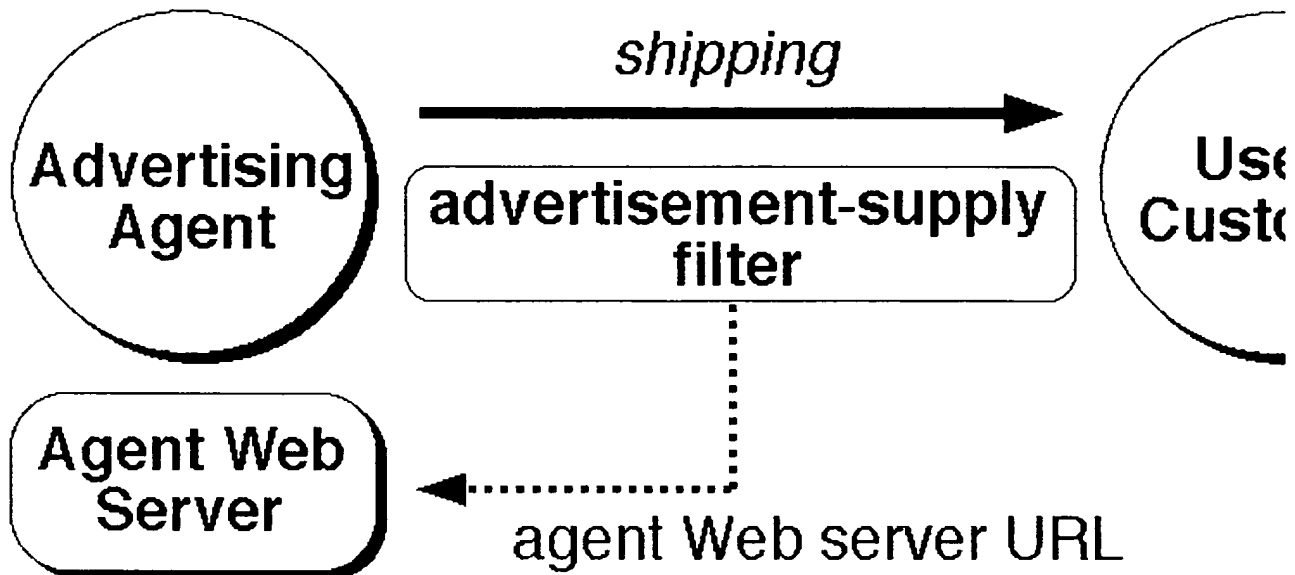
## Plug-in UNIX-type filters

- Invoked with target URL and user ID
- Input is a target Web page or an output from the preceding filter
- May access any other Web servers and/or local disks during transformation



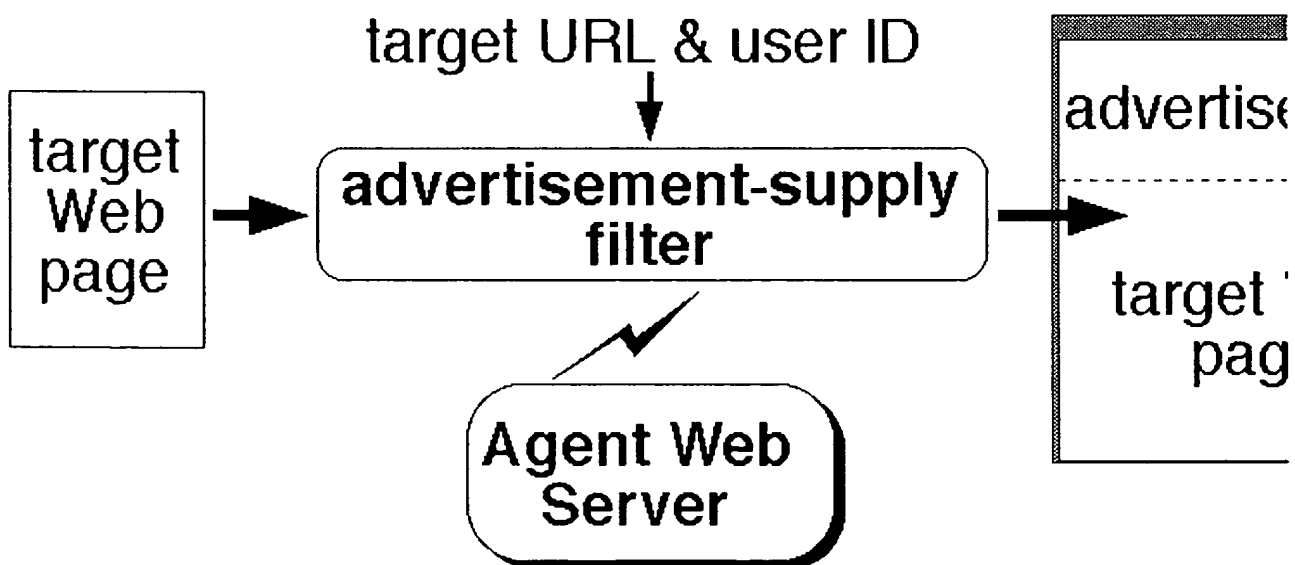
## Advertisement-supply filter

- Supplied by advertising agent to the customers
- Hence it knows contact path (URL) to agent Web server



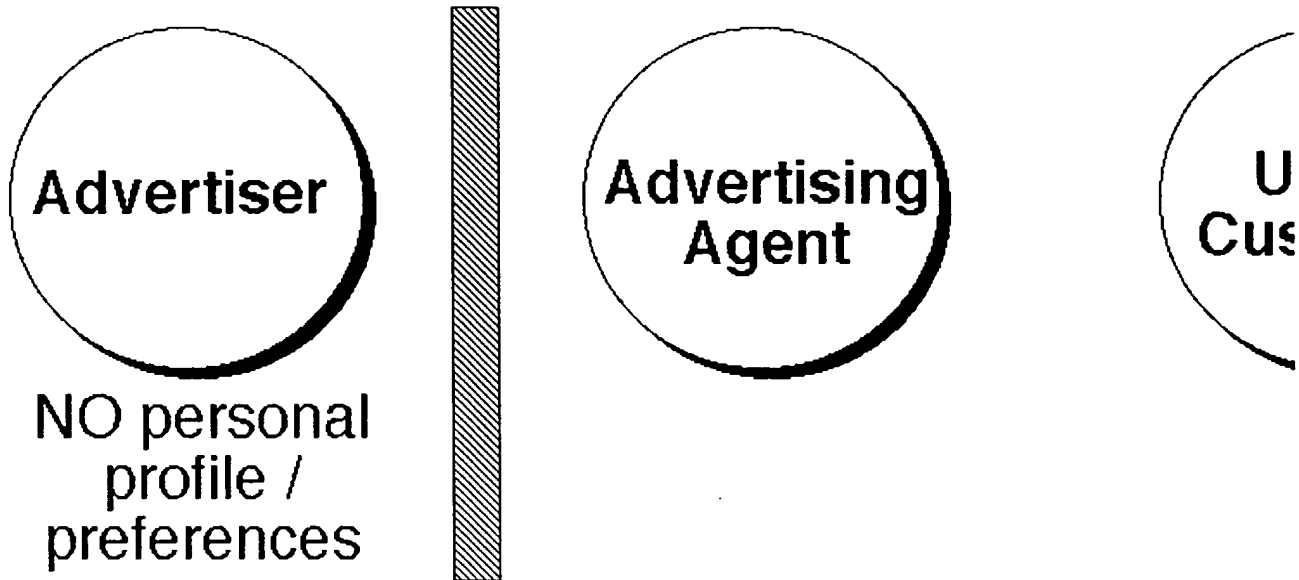
## Advertisement-supply filter

- Request agent Web server to send advertisements
- Merge advertisements into Web pages



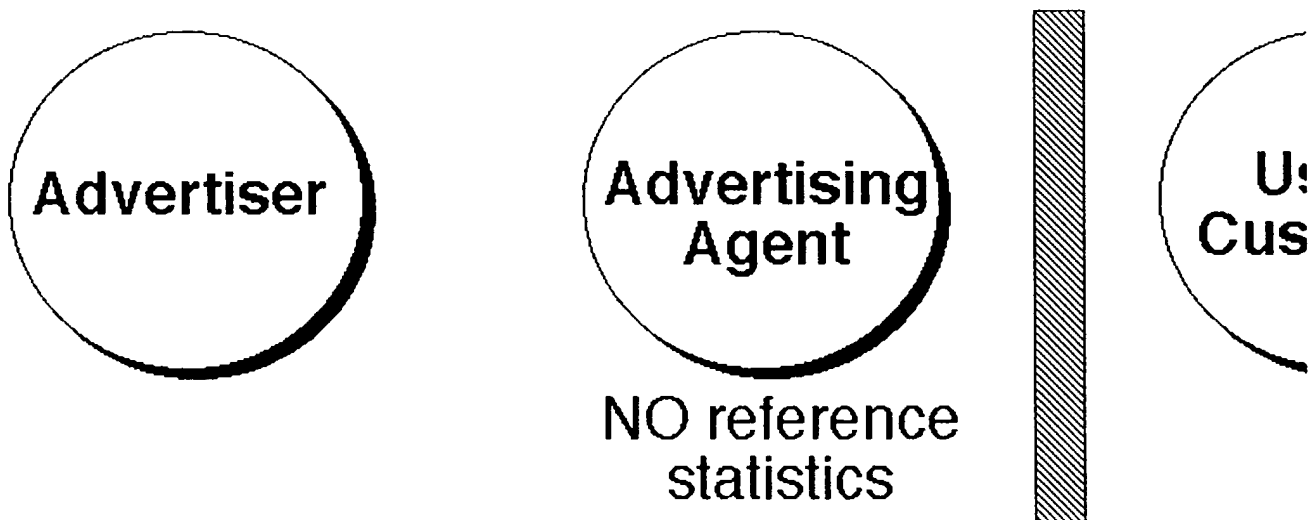
## Privacy Issue

- Agents should be forbidden to forward private customer information to the advertisers



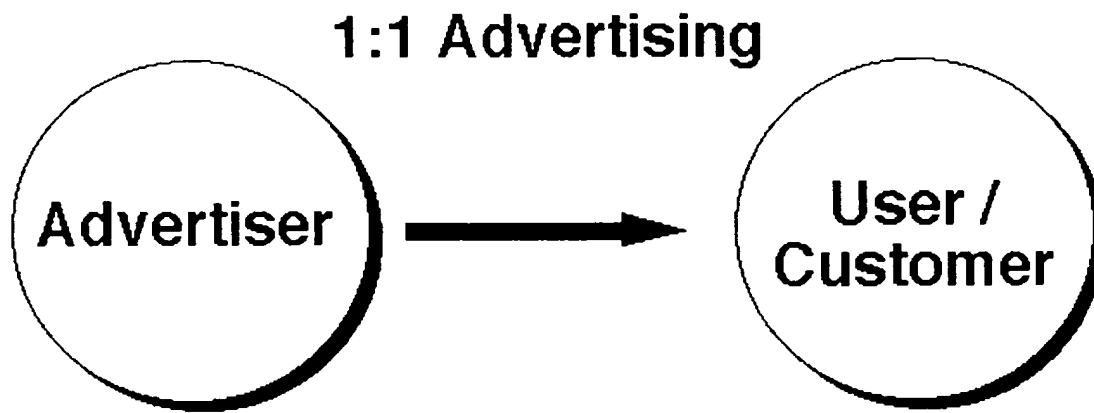
## Privacy Issue

- Advertisement-supply filter can be disabled anytime



## Conclusion

- 1:1 advertising framework using Web Browser
- Prototyped the framework





## Fifth International World Wide Web Conference

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- WWW Use by Alternative Platforms: [Workshop preliminary report](#)
- The NCSTRL: policy and technology issues of federated digital libraries: [Latest information](#)

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- [Opening Session](#):
  - [Jean-Jacques Damlamian](#), France Télécom (Slides and Transcript of the talk)
  - [John Patrick](#), IBM (Slides and Transcript of the talk) **New!**
- [Tim Berners-Lee](#), W3C
- [Rob Glaser](#), Progressive Networks
- [Closing Session](#)

## Technical Program - Invited Speakers

- [IS1: Stu Weibel](#) (HTML slides)
- [IS2: Bob Scheifler](#) (HTML slides) **New!**
- [IS4: Mark Pesce](#) (Transcript of the talk in HTML text)

## Technical Program - Paper Sessions

- [P1: Main Memory Caching of Web Documents](#) : Evangelos P. Markatos
- [P2: Web Cache Coherence](#) : Adam Dingle, Tomas Partl
- [P3: Introducing Application-level Replication and Naming into today's Web](#) : Michael Baentsch, Georg Molterh, Peter Sturmh
- [P4: WWW Access to legacy Client/Server Applications](#) : Stephen E. Dossick, Gail E.Kaiser
- [P5: PageSpace: an Architecture to Coordinate Distributed Applications on the Web](#) : Paolo Ciancarini, Andreas Knoche, Robert Tolksdorf, Fabio Vitali
- [P6: Lisp Web: a Specialized HTTP Server for Distributed AI Applications](#) : Alberto Riva, Marco Ramoni
- [P7: An Investigation of Documents from the WWW](#) : Allison Woodruff, Paul M. Aoki, Eric Brewer, Paul Gauthier, Lawrence A. Rowe
- [P8: From User Access Patterns to Dynamic Hypertext Linking](#) : Tak Woon Yan, Matthew Jacobsen, Hector Garcia-Molina, Umeshwar Dayal
- [P9: Measuring the Web](#) : Tim Bray
- [P10: Supporting the Web: a Distributed Hyperlink Database System](#) : R. Kipp Jones, James E. Pitkow
- [P11: Author-oriented Link Management](#) : Michael L. Creech
- [P12: Open Information Services](#) : Leslie Carr, Garry Hill, David De Roure, Wendy Hall, Hugh Davis
- [P13: Distributed Active Objects](#) : Mark A. Najork, Marc H. Brown
- [P14: Exorcising Daemons: a modular and lightweight approach to deploying applications on the Web](#) : Jonatahn Trevor, Richard Bentley, Gerrit Wildgruber
- [P15: Pan-Browser Support for Annotations and Other Meta-Information on the WWW](#) : Mathew A.Schickler, Murray S. Mazer, Charles Brooks



- P16: Interactively Restructuring HTML Documents : Stéphane Bonhomme, Cécile Roisin
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- P28: Synchronous Navigation Control for Distance Learning on the Web : Ping-Jer Yeh, Bih-Horng Chen, Ming-Ghih Lai, Shyan-Ming Yuan
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- P30: Supporting Hierarchical Guided Tours in the WWW : Franz J. Hauck
- P31: An architecture for Integrating OODBs with WWW : Jack Jingshuang Yang, Gail E. Kaiser
- P32: Fixing the <<Broken-Link>> Problem: the W3Objects Approach : David Ingham, Steve Caughey, Mark Little
- P33: CorbaWeb: a Generic Object Navigator : Philippe Merle, Christophe Gransart, Jean-Marc Geib
- P34: Weblint: Quality Assurance for the WWW : Neil Bowers
- P35: WebWriter: A Browser-based Editor for Constructing Web Applications : Arturo Crespo, Eric A. Bier
- P36: WebQuest: Substantiating Education in Edutainment through Interactive Learning Games : Corrina Perrone
- P37: Automatically Organizing Bookmarks per Contents : Yoelle S. Maarek, Israel Z. Ben Shaul
- P38: WebGUIDE: Querying and Navigating Changes in Web Repositories : Fred Douglass, Thomas Ball, Yih-Farn Chen, Eleftherios Koutsofios
- P39: Nif-t-nav: A Hierarchical Navigator for WWW pages : Kirsten Jones
- P40: Active Forms : Steve Bal, Paul Thistlewaite
- P41: A Web Navigator with applets in Caml : François Rouaix
- P42: A Network Programming Model for Efficient Information Access on the WWW : Andrzej Duda, Stéphane Perret
- P43: Filling HTML Forms simultaneously: CoWeb - Architecture and Functionality : Stephan Jacobs, Michael Gebhardt, Stefanie Kethers, Wojtek Rzas
- P44: Performance Engineering of the World Wide Web: Application to Dimensioning and Cache Design : Jean-Chrysostome Bolot, Philipp Hoschka
- P45: The UK National Web Cache - The State of the Art : Neil Smith

- P46: The Harvest Object Cache in New Zealand : Donald Neal
- P47: TeleWeb: Loosely Connected Access to the Word Wide Web : Bill N. Schilit, Fred Douglass, David M. Kristol, Paul Krzyzanowski, James Sienicki, John A. Trotter
- P48: Reducing WWW Latency and Bandwidth Requirements by Real-Time Distillation : Armando Fox, Eric A. Brewer
- P49: Real-Time Geographic Visualization of World Wide Web Traffic : Daniel A. Reed
- P50: Enticing Online Shoppers to Buy - A Human Behavior Study : Alice Richmond
- P51: Business On the Web: Strategies and Economics : Somendra Pant, Dr. Cheng Hsu
- P52: Ubiquitous Advertising on the WWW: Merging Advertisement on the Browser : Youji Kohda, Susumu Endo
- P53: Agent-based Workflow: TRP Support Environment (TSE) : Jin W. Chang, Colin T. Scott,
- P54: Towards a World-Wide Data Base : Erik Sandewall
- P55: Electronic Management of the Peer Review Process : Jason Mathews, Barry E. Jacobs
- P56: Virtual Sardinia: a Large-scale Hypermedia Regional Information System : Andrea Leone, Enrico Gobetti
- P57: RAVE: Real-Time Services for the Web : Paul England, Bob Allen, Ron Underwood
- P58: Interactive Video on WWW: Beyond VCR-like Interfaces : Arun Katkere, Jennifer Schlenzig, Amarnath Gupta, Ramesh Jain

### Technical Program - Panel Sessions

- Cooperative Work and the Web: Richard Bentley (Chair)
- Distributed Object Technology and the Web: Mark Madsen (Chair)
- Multicasting & Real-time Applications and the Future of the Web: A Network-Distributed Panel: R.P.C. Rodgers, Jaromir Likavec (Co-Chair)
- The Future of Java Development: Vania Joloboff (Chair)
- Uniform Resource Characteristics: Metadata for the Masses: Mark Madsen (Chair)
- Data Protection and Respect of Privacy on the Internet: Louise Cadoux (Chair) - Transcript of some talks in French.
- Efficiency of Internet Indexing: Nick Arnett (Chair)

### Technical Program - W3C Sessions

- A Comprehensive View of WWW Standards: Larry Masinter  
(Powerpoint version of these slides)
- Overview of W3C Activities: Vincent Quint
- HTML & Cascading Style Sheets: "HTML" Dave Raggett - "Cascading Style Sheets", Hakon Lie
- W3C Software: "Library", Henry Frystyk Nielsen - "Server", Anselm Baird-Smith - "Client", Vincent Quint

### Technical Program - Industrial Sessions

- From the Minitel into the Internet - France Telecom, Yves Parfait

### SMEs Forum "Business on the Web" - Plenary Sessions

- Business Implications of the Internet: Bernard Vergnes
- Business on the Web for SMEs Award Session: Michel Carpentier, Jean-Michel Blottière

## **SMEs Forum "Business on the Web" - Invited Speakers**

## **SMEs Forum "Business on the Web" - Paper Sessions**

- P50: Enticing Online Shoppers to Buy - A Human Behavior Study : Alice Richmond
- P51: Business On the Web: Strategies and Economics : Somendra Pant, Dr. Cheng Hsu
- P52: Ubiquitous Advertising on the WWW: Merging Advertisement on the Browser : Youji Kohda, Susumu Endo

## **SMEs Forum "Business on the Web" - Panel Sessions**

- Data Protection and Respect of Privacy on the Internet: Louise Cadoux (Chair) - Transcript of some talks in French.

## **SMEs Forum "Business on the Web" - Business in Practice**

- BP3: Legal & Regulatory: Ian Walden, Tarlo Lyons (Co-Chair)

## **SMEs Forum "Business on the Web" - Hands-on Experiences**

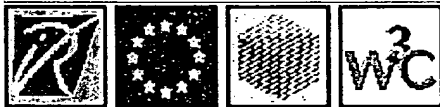
- "Business on the Web" Hands-On Experiences

## **SMEs Forum "Business on the Web" - Success Stories**

- SME Success Stories 2

## **Developer's Day**

- Agents / Robots: Peter Doemel
- Distributed Objects: Andrew Watson (Chair)
- Graphics: Chris Lilley
- HTTP: Roy T. Fielding (Chair)
- An SGML-Based Web Server: Jon Bosak
- Web Security - Where Do I Really Want To Go Today?: Adam Cain



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